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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/538,801

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Jung_Il Byun

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JONES DAY
222 EAST 41ST ST
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EXAMINER

GOFF II, JOHN L

ART UNIT

PAPER NUMBER

1791

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DELIVERY MODE

06/16/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/538,801	Applicant(s) BYUN ET AL.	
	Examiner John L. Goff	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/4/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the amendment filed on 3/10/08.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102/103

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
4. Claims 1, 3-6, 8, and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Suga et al. (EP1093160).

Suga discloses an anisotropic-electroconductive adhesive comprising an insulating adhesive component containing a radical polymerizable compound and a polymerization initiator and a plurality of insulating coated electroconductive particles dispersed in the insulating adhesive component wherein the insulating coated electroconductive particles have a coating layer made of insulating thermoplastic resin on a surface of the electroconductive particles (Paragraphs 0013-0015, 0019, 0022, 0023, and 0060). Suga teaches the adhesive is interposed

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between facing electrodes of two circuit boards and thermally pressed to *melt* and remove at least part of the insulating coating of the electroconductive particles to electrically connect the faced circuit electrodes and to cure the insulating adhesive component so that the circuit electrodes are adhered and fixed (Figure 1 and Paragraphs 0022, 0039, 0040, and 0046).

Regarding the limitation “wherein a softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component” it is noted applicants specification describes “If the softening point of the insulating thermoplastic resin composing the coating layer 152 formed on the electroconductive particle 151 is higher than the exothermic peak temperature of the insulating component 140, the insulating adhesive component 140 will be cured before the coating 152 is softened, so the coating layer which is contacted with the circuit electrodes 11 and 21 in the pressure direction are not removed, thereby causing a short circuit” (Page 15, lines 2-8). Thus, because Suga teaches the insulating coating of the electroconductive particles is *melting* and removed before the insulating adhesive component is cured (Paragraphs 0022 and 0040) inherently the softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component taught by Suga otherwise the insulating coating would remain, i.e. not melt, and there would be no electrical interconnection formed as required.

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Regarding the exothermic peak temperature, Suga teaches a curing initiation temperature for the insulating adhesive component in the range of 80 to 150 °C wherein the curing initiation temperature is an exothermic peak temperature (Paragraph 0015).

Regarding claim 3, Suga teaches the coating layer made of the insulating thermoplastic resin has a thickness of 0.05 to 2 μm (Paragraph 0024). Regarding claim 4, Suga teaches the electroconductive particle is made by forming a metal thin layer onto a surface of a nucleus material (Paragraph 0019). Regarding claim 5, Suga teaches the insulting adhesive component further includes thermosetting resin and a curing agent (Paragraphs 0013-0015). Regarding claim 6, Suga teaches acrylate based compounds (Paragraph 0013). Regarding claim 8, Suga teaches the insulating adhesive component further includes thermoplastic resin (Paragraph 0016).

Claim Rejections - 35 USC § 103

5. Claims 1, 3-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suga in view of Tsukagoshi et al. (U.S. Patent 6,158,115).

Suga discloses an anisotropic-electroconductive adhesive comprising an insulating adhesive component and a plurality of insulating coated electroconductive particles dispersed in the insulating adhesive component wherein the insulating coated electroconductive particles have a coating layer made of insulating thermoplastic resin on a surface of the electroconductive particles. Suga teaches the adhesive is interposed between facing electrodes of two circuit boards, e.g. an IC chip and an IC board and thermally pressed to *melt* and remove at least part of the insulating coating of the electroconductive particles to electrically connect the faced circuit electrodes and to cure the insulating adhesive component so that the circuit electrodes are

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adhered and fixed. Suga does not specifically teach the insulating adhesive component comprises an acrylate based radical polymerizable compound and an organic peroxide polymerization initiator. Suga does teach there may be used without restriction any kind of resin capable of curing (Paragraph 0013). Tsukagoshi discloses an anisotropic-electroconductive adhesive comprising an insulating adhesive component containing a radical polymerizable acrylate based compound and a radical peroxide, i.e. considered organic peroxide, polymerization initiator and a plurality of insulating coated electroconductive particles dispersed in the insulating adhesive component wherein the insulating coated electroconductive particles have a coating layer made of insulating resin on a surface of the electroconductive particles (Column 10, lines 18-33 and Column 11, lines 28-39). Tsukagoshi teaches the adhesive is interposed between facing electrodes of two circuit boards and thermally pressed to electrically connect the faced circuit electrodes and to cure the insulating adhesive component so that the circuit electrodes are adhered and fixed (Figure 6B and Figure 8 and Column 9, lines 65-67 and Column 10, lines 1-17). Tsukagoshi teaches the insulating adhesive component is preferred because it has a short set time, improves the efficiency of the connection, and has excellent adhesive properties (Column 10, lines 18-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the insulating adhesive component taught by Suga the insulating adhesive component taught by Tsukagoshi which has a short set time, improves the efficiency of the connection, and has excellent adhesive properties.

Regarding the limitation “wherein a softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component” it is noted applicants specification describes “If the softening point of the insulating thermoplastic resin

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composing the coating layer 152 formed on the electroconductive particle 151 is higher than the exothermic peak temperature of the insulating component 140, the insulating adhesive component 140 will be cured before the coating 152 is softened, so the coating layer which is contacted with the circuit electrodes 11 and 21 in the pressure direction are not removed, thereby causing a short circuit” (Page 15, lines 2-8). Thus, because Suga teaches the insulating coating of the electroconductive particles is *melted* and removed before the insulating adhesive component is cured (Paragraphs 0022 and 0040) intrinsically the softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component. In the event it is shown that this is not necessarily true the following rejection would apply. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component taught by Suga as modified by Tsukagoshi otherwise the insulating coating would remain, i.e. not melt, and there would be no electrical interconnection formed as required.

Regarding the exothermic peak temperature, Tsukagoshi teaches the activation temperature and exothermic peak temperature of the insulating adhesive component is in the range of 50 to 150 °C (Column 10, lines 55-67) wherein Suga teaches a curing initiation temperature for the insulating adhesive component in the range of 80 to 150 °C such that 80 °C is an expressly disclosed exothermic peak temperature within the claimed range (Paragraph 0015).

Regarding claim 3, Suga teaches the coating layer made of the insulating thermoplastic resin has a thickness of 0.05 to 2 μm . Regarding claim 4, Suga teaches the electroconductive particle is made by forming a metal thin layer onto a surface of a nucleus material. Regarding

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claim 5, Suga as modified by Tsukagoshi teach the insulating adhesive component further includes thermosetting resin and a curing agent. Regarding claim 8, Suga teaches the insulating adhesive component further includes thermoplastic resin (Paragraph 0016).

6. Claims 1, 3-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukagoshi in view of Suga.

Tsukagoshi discloses an anisotropic-electroconductive adhesive comprising an insulating adhesive component containing a radical polymerizable acrylate based compound and a radical peroxide, i.e. considered organic peroxide, polymerization initiator and a plurality of insulating coated electroconductive particles dispersed in the insulating adhesive component wherein the insulating coated electroconductive particles have a coating layer made of insulating resin on a surface of the electroconductive particles. Tsukagoshi teaches the adhesive is interposed between facing electrodes of two circuit boards and thermally pressed to electrically connect the faced circuit electrodes and to cure the insulating adhesive component so that the circuit electrodes are adhered and fixed. Tsukagoshi does not teach the coating layer made of insulating resin is thermoplastic. Suga discloses an anisotropic-electroconductive adhesive comprising an insulating adhesive component and a plurality of insulating coated electroconductive particles dispersed in the insulating adhesive component wherein the insulating coated electroconductive particles have a coating layer made of insulating thermoplastic resin on a surface of the electroconductive particles. Suga teaches the adhesive is interposed between facing electrodes of two circuit boards, e.g. an IC chip and an IC board and thermally pressed to melt and remove at least part of the insulating coating of the electroconductive particles to electrically connect the faced circuit electrodes and to cure the insulating adhesive component so that the circuit

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electrodes are adhered and fixed. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the coating layer made of insulating resin taught by Tsukagoshi a thermoplastic as was known as suitable in the same art for forming insulating coating electroconductive particles as shown by Suga.

Regarding the limitation “wherein a softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component” it is noted applicants specification describes “If the softening point of the insulating thermoplastic resin composing the coating layer 152 formed on the electroconductive particle 151 is higher than the exothermic peak temperature of the insulating component 140, the insulating adhesive component 140 will be cured before the coating 152 is softened, so the coating layer which is contacted with the circuit electrodes 11 and 21 in the pressure direction are not removed, thereby causing a short circuit” (Page 15, lines 2-8). Thus, because Tsukagoshi teaches the electrodes of the circuit boards are electrically interconnected, i.e. the insulating thermoplastic resin must be at least partially removed and Suga teaches the insulating thermoplastic resin melts intrinsically the softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component. In the event it is shown that this is not necessarily true the following rejection would apply. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the softening point of the insulating thermoplastic resin is lower than an exothermic peak temperature of the insulating adhesive component taught by Tsukagoshi as modified by Suga otherwise the insulating coating would remain and there would be no electrical interconnection formed as required.

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Regarding the exothermic peak temperature, Tsukagoshi teaches the activation temperature and exothermic peak temperature of the insulating adhesive component is in the range of 50 to 150 °C (Column 10, lines 55-67) which includes all of the claimed range any of which temperatures are obviously suggested absent any unexpected results.

Regarding claim 3, Suga teaches the coating layer made of the insulating thermoplastic resin has a thickness of 0.05 to 2 μm . Regarding claim 4, Tsukagoshi teaches the electroconductive particle is made by forming a metal thin layer onto a surface of a nucleus material. Regarding claim 5, Tsukagoshi as modified by Suga teach the insulting adhesive component further includes thermosetting resin and a curing agent. Regarding claim 8, Suga teaches the insulating adhesive component further includes thermoplastic resin to impart film-forming properties which would have been obvious to include in the insulating adhesive component taught by Tsukagoshi for the same.

Response to Arguments

7. Applicant's arguments filed 3/10/08 have been fully considered but they are not persuasive.

Applicants argue, “However, ¶ 15 of Suga actually discloses “a curing initiation temperature of 80-150°C may be used.” A curing initiation temperature is the temperature at which curing is initiated. This is different from the exothermic peak temperature, which is the peak temperature produced by the curing reaction. *See, e.g.* the specification of EP0845507, which discloses numerous materials for which the curing initiation temperature and exothermic

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peak temperature are *different*. Thus, Suga fails to disclose the limitation “an exothermic peak temperature of the insulating adhesive component is in the range of 80°C~120°C.”.

The curing initiation temperature is a temperature which lies on an exothermic peak temperature curve such that clearly this temperature is considered an exothermic peak temperature. It is unclear how the powder coatings taught by EP0845507 are relevant to the instant application as the reference was not cited in applicants specification or incorporated by reference as having any particular relevance. In any event, as noted on page 14 of EP0845507 the curing initiation temperature is “the kickoff of the exothermic peak” which is evidence that the curing initiation temperature is an exothermic peak temperature. As to applicants argument that “This is different from the exothermic peak temperature, which is the peak temperature produced by the curing reaction.”, the claims are not commensurate in scope with this argument.

Applicants further argue, “Here, the cited limitation of claim 1 does not *necessarily* flow from the teaching of Suga. For example, Suga at ¶ 22 teaches that the insulating coating should be “melted or destroyed when the connecting material is subjected to heat-pressing.” This allows for various possibilities, for example that the coating is destroyed by the mechanical forces applied during “heat-pressing.” Thus, Suga also fails to disclose this limitation, either expressly or inherently.”.

As noted by applicants Suga expressly teaches the thermoplastic insulating coating melts which melting occurs during heat pressing to cure the insulating resin, i.e. a temperature on the exothermic peak curve, such that clearly the thermoplastic softens at a temperature lower than an exothermic peak temperature wherein even where it somehow possible to show such is not necessarily the case it would be obvious that the thermoplastic insulting coating melt at a

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temperature below the temperature at which the insulating adhesive is cured, i.e. an exothermic peak temperature, otherwise how would melting occur as expressly disclosed in Suga.

Applicants further argue, “Indeed, Tsukagoshi teaches away from the present invention. See col. 11, ll.51-62, where Tsukagoshi teaches that particles with plastic cores and *conductive* coatings are preferable--i, e., the opposite configuration of the present invention.”.

Tsukagoshi teaches in Column 11, lines 34-39, “Also, *insulator-coated particles having electrically conducting cores coated with an insulating layer*, or the combination of conductive particles and insulating particles of glass, ceramic or plastic *may be used to improve the resolution.*” (Emphasis added).

Applicants further argue, “Regarding former claim 2, now incorporated into claim 1, the Examiner notes that Tsukagoshi at col. 10, ll.55-67 discloses an exothermic peak temperature in the range of 50 to 150°C. However, claim 1 recites a narrower range, namely 80 to 120°C, and this is a critical range. As explained in the specification (see the PCT publication at page 7, lines 6-7), if the exothermic peak temperature is above 120°C the desired quick curing cannot be achieved, and, on the other hand, a material with an exothermic peak temperature below 80°C will present storage problems.”.

Applicants specification does not demonstrate any criticality for the claimed range. Applicants specification states on page 7, lines 6-7, “It is preferable that exothermic peak temperature of the component is between 80°C and 120°C in view of quick curing at a low temperature and storage properties.”. There is no data to support applicants argument that “if the exothermic peak temperature is above 120°C the desired quick curing cannot be achieved, and,

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on the other hand, a material with an exothermic peak temperature below 80°C will present storage problems”.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John L. Goff** whose telephone number is **(571) 272-1216**. The examiner can normally be reached on M-F (7:15 AM - 3:45 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John L. Goff/
Primary Examiner, Art Unit 1791